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GUEST EDITORIAL

Special Issue: Application on Non-Linear Techniques in Robot Control

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This special issue addresses control of different robots: mobile, walking, flying, and others. By nature, the control techniques originate in differential geometry and Lapunov stability theory because of the fact that the aforementioned robots are described by highly non-linear equations. It is highly interesting to know the limitations of these techniques in comparison with simple techniques such as Taylor's linearization. At the same time, we want to see their applications in practice, therefore, papers showing good theory with experiments are mostly welcome. We strongly believe that non-trivial theory supported by good experimental work may add a new value to robot control. It is worth pointing out that many mathematicians are involved in control of non-linear systems.

On May 15, 2015 we organised a seminar at Poznan University of Technology, under auspices of the IEEE Polish Section Robotics and Automation Chapter. This seminar gathered scientists working in Mathematics and engineers interested in formal methods of control of non-linear systems. Papers were presented during this one-day seminar. Five out of 6 presented papers were considered for possible publication in the Journal of Intellegent and Robotic Systems. They are listed below:

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1. D. Pazderski, Waypoint following for differentially driven wheeled robots with limited velocity perturbations, Asymptotical and practical stabilisation using transverse function approach.
2. A. Mazur, W. Domski, E. Roszkowska, Control of underactuated skid steering mobile platforms based on extended factitious force concept.
3. T. Rybus, K. Seweryn, J. Sasiadek, Control system for free-floating space manipulator based on Nonlinear Model Predictive Control (NMPC).
4. I. Góral, K. Tchoń, Lagrangian Jacobian motion planning, A parametric approach.
5. W. Kowalczyk, M. Przybyła, K.Kozłowski, Setpoint control of mobile robot with obstacle detection and avoidance using navigation function - Experimental verification.

Another important event that took part last year in Poland was the International Workshop on Robot Motion and Control, RoMoCo, (www.romoco.put.poznan.pl), which was held at Poznan University of Technology, Poznań, from July 6 to July 8, 2015. This event was technically co-sponsored by the IEEE Robotics and Automation Society, the IEEE Control Systems Society, and the International Federation of Automatic Control. The best papers were selected from this event based on the reviews done by the members of the International Program Committee of RoMoCo and their authors were invited to submit extended versions of their papers to the Journal of

Intelligent and Robotic Systems. Finally, the following papers were accepted for publication in the Journal of Intelligent and Robotic Systems:

1. I. Zubrycki, G. Granosik, Novel haptic device using jamming principle for providing kinaesthetic feedback in glove-based control interface.
2. G. Pająk, I. Pająk, Point-to-point collision-free trajectory planning for mobile manipulators.
3. M. Galicki, Rabust task space accurate control of robotic manipulators.
4. K. Zadarnowska, Switched modelling and task-priority motion planning of wheeled mobile robots subject to slipping.
5. T. Zielińska, Minimising energy cost in multi-legged walking machines.
6. W. Gao, Z.P. Jiang, Nonlinear and adaptive sub-optimal control of connected vehicles: a global dynamic programming approach.

This opens the special issue to an international audience of people working in robotics and automation.

I strongly believe that these papers due to new theoretical and experimental results in robot control would be of interest to the Readers of the Journal of Intelligent and Robotic Systems. I would like to express my appreciation to the authors of this Special Issue for the high quality of their work and the cooperation during the review process. Also, I would like to thank all reviewers for their valuable comments and suggestions that contributed significantly to the improvement of the papers quality. Special thanks are directed to Professor Kimon V. Valavanis, Editor-in-Chief of the Journal of Intelligent and Robotic Systems giving me the opportunity of publishing this Special Issue.